

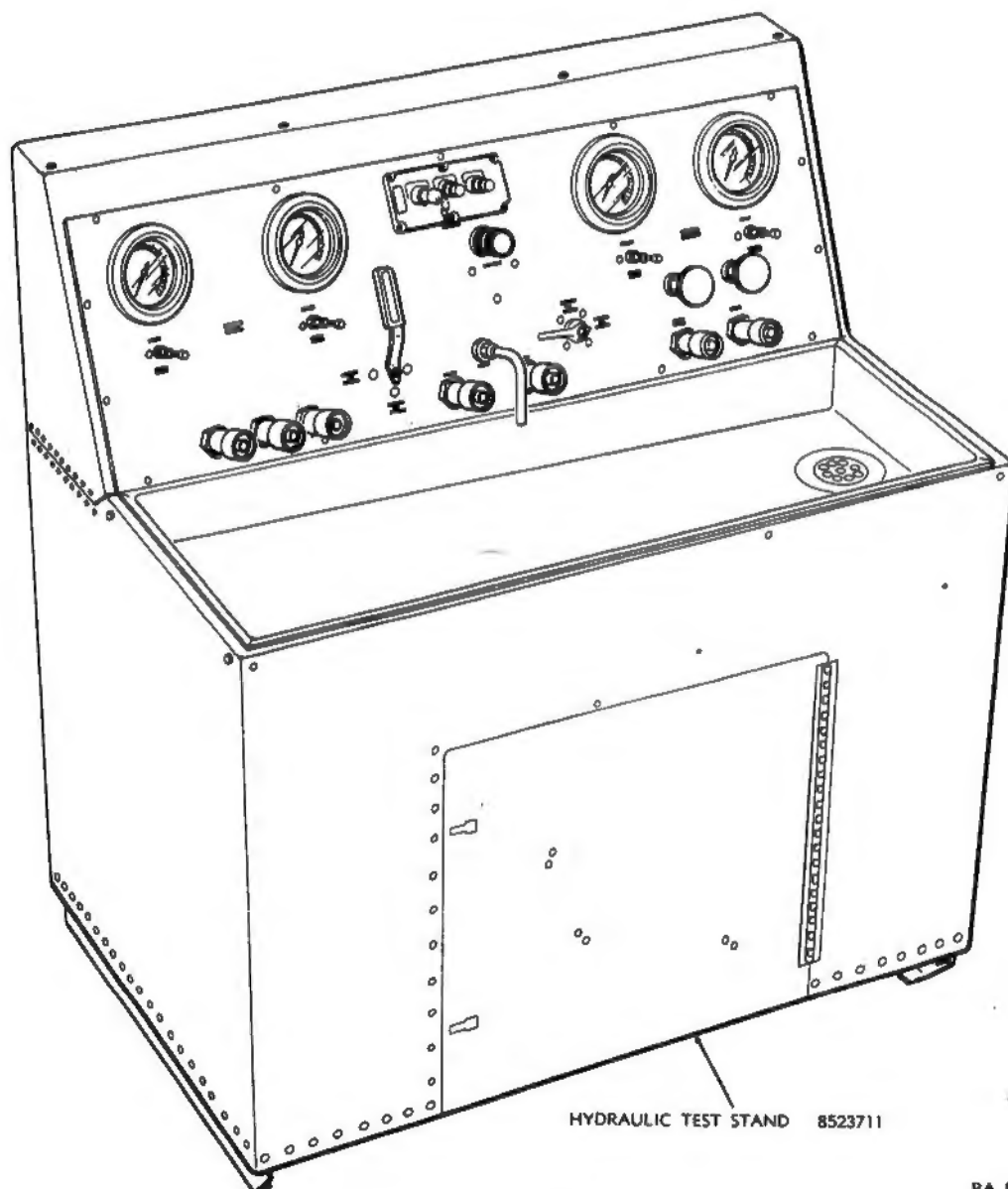
## CHAPTER 3

### PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR DIRECT AND GENERAL SUPPORT MAINTENANCE

#### 30. General

Tools, equipment, and maintenance parts over and above those available to the using

organization as common tools are supplied to Direct and General Support maintenance units for maintaining and repairing the materiel.



RA PD 463928

*Figure 49. Hydraulic test stand.*

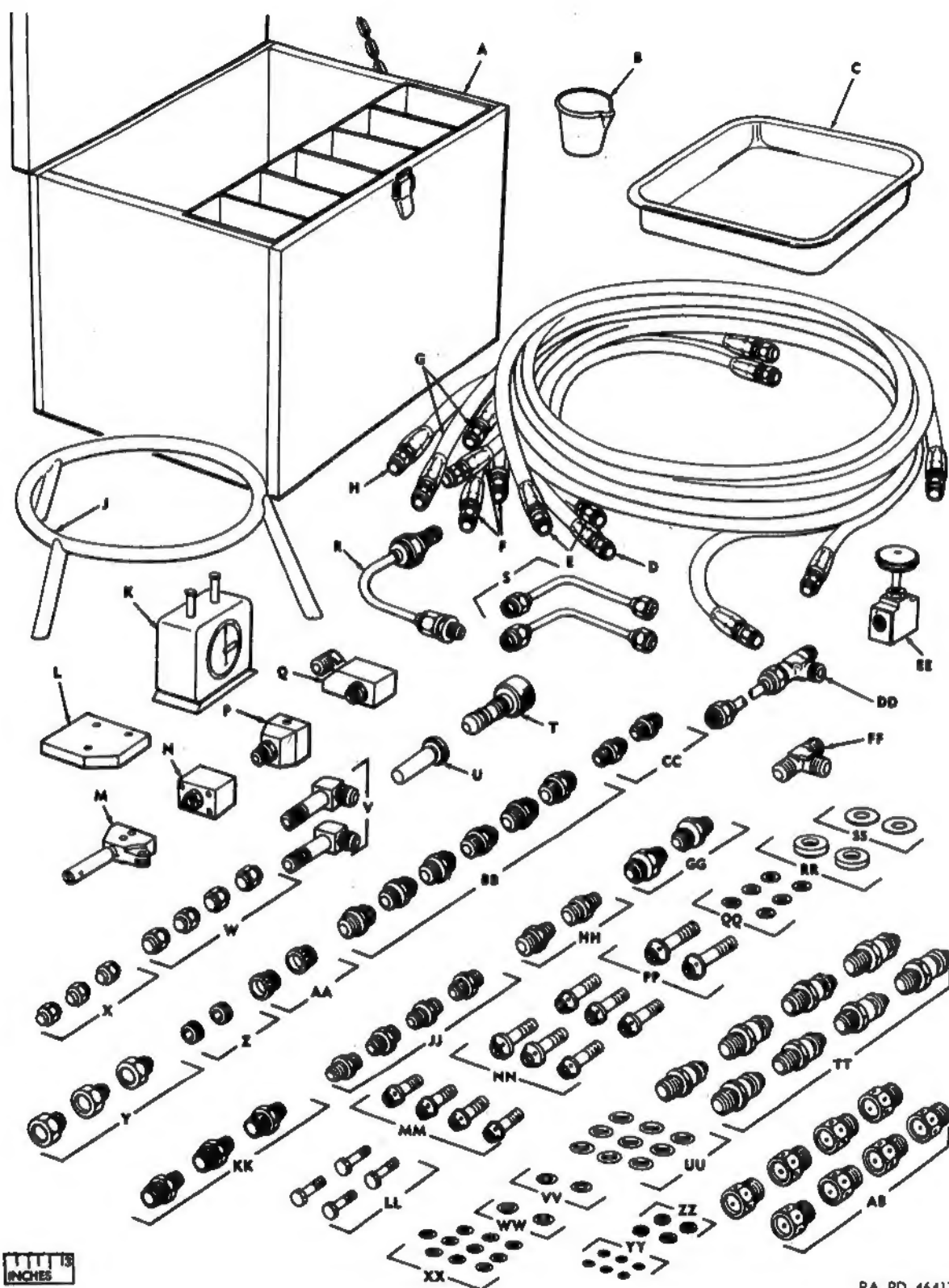
Table IV. Special Tools and Equipment

Item	Identifying No.	References			Use
		Fig.	Par.	TM	
Hydraulic test stand	8523711	49, 50	60d(3) 73c(2) 97d(2) 99d 102d	9-4935-254- 15	Tests for leakage and proper operation of the two locking wedge hydraulic cylinders, two power cylinders, two equilibrators cylinders, two shock struts, four decelerators, a hydraulic up-lock, and a hydraulic down-lock.
Launcher hydraulic package tester	8529385	51	54	9-4935-250- 35	Tests the operation of the components of the hydraulic pumping unit.
Launcher electrical function tester	8523704	52	47 49 51 52	9-4935-255- 14	Tests the Hercules monorail launcher and launching-handling rail electrical systems.
Erecting beam support	9029692	53	36d	None	Supports the erecting beam at a 12-degree angle to provide easier access to launcher components.
Fixed jaw crimping tool	8020492	54	None	None	For crimping the insulated terminals and the links on wires of the cable assemblies.
Cable connector wrench	8015353	54	None	None	For connecting the cable assembly connectors.
Single indent crimping tool	8020491	54	None	None	For crimping the insulated terminals and links on wires of the cable assemblies.
Protective cap	8022088	55	80	None	Used on 1/4-inch diameter tube assemblies.

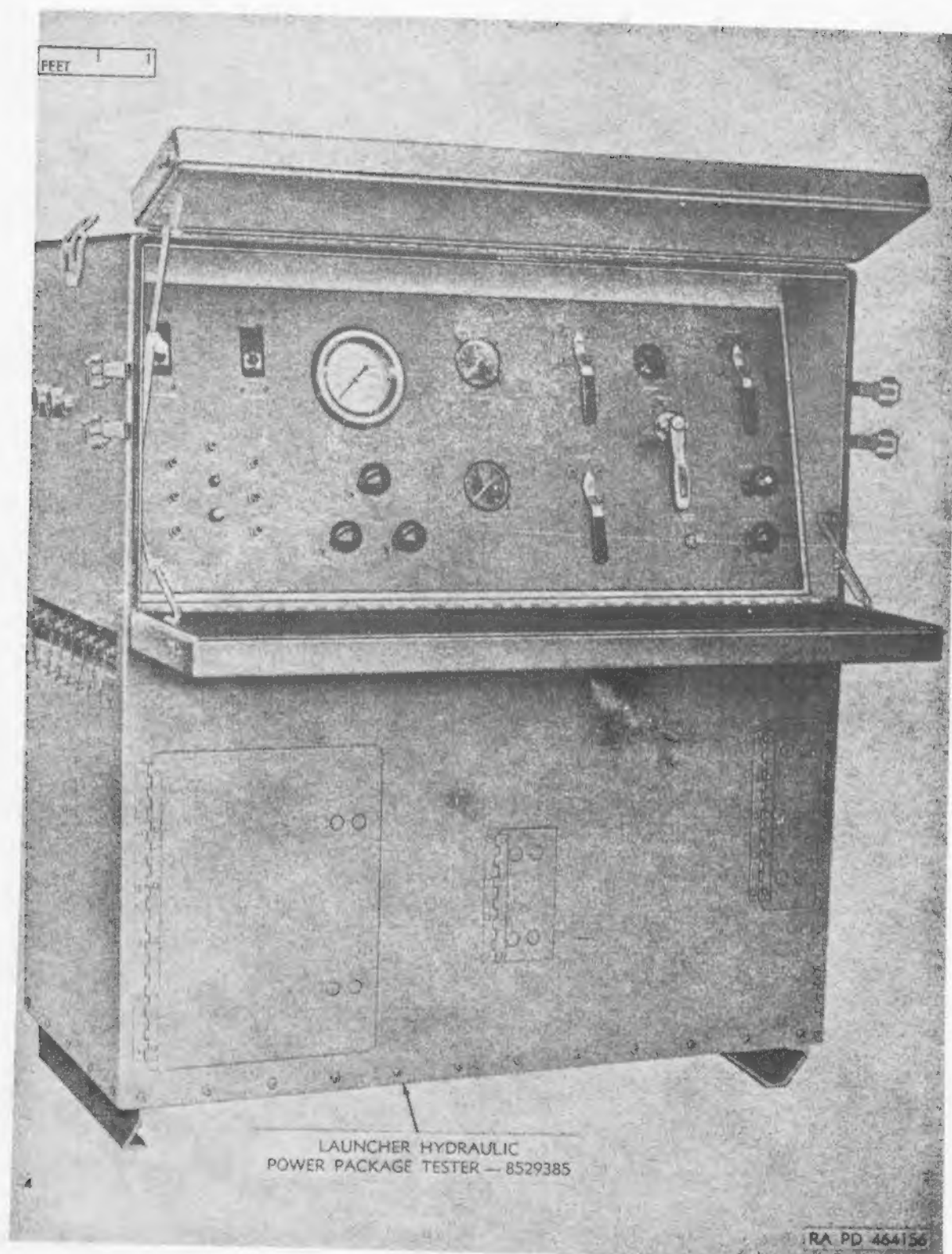
A — Box assy  
 B — Graduate  
 C — Pan  
 D — Hose assy 8169537  
 E — Hose assy 8169538 (2)  
 F — Hose assy 8169539 (3)  
 G — Hose assy 8169536 (2)  
 H — Hose assy 8169283  
 J — Support  
 K — Timer-stop  
 L — Plate  
 M — Power plug assy  
 N — Block assy 8165326  
 P — Manifold assy  
 Q — Block assy 8163423  
 R — Tube assy 8163435  
 S — Tube assy 8164331 (2)  
 T — Thumbscrew  
 U — Plug 8161142  
 V — Elbow (2)  
 W — Cap 8169255 (4)  
 X — Cap 8169024 (3)  
 Y — Reducer AN894-6-4 (3)  
 Z — Plug AN932-3 (2)

AA — Plug AN814-4 (2)  
 BB — Union AN815-6 (6)  
 CC — Union AN815-4 (2)  
 DD — Tube assy 8163403  
 EE — Valve assy  
 FF — Tee  
 GG — Reducer AN919-10 (2)  
 HH — Adapter AN816-7 (2)  
 JJ — Adapter AN816-6 (4)  
 KK — Adapter AN816-6-2 (3)  
 LL — Bolt AN3-16A (4)  
 MM — Bolt 8175058 (4)  
 NN — Bolt 8176305 (6)  
 PP — Bolt 8175059 (2)  
 QQ — Washer MS20002C4 (6)  
 RR — Washer 8014699 (2)  
 SS — Washer 8014699 (2)  
 TT — Half coupling (8)  
 UU — Packing 8034459 (9)  
 VV — Packing 8034458 (2)  
 WW — Packing 501220 (2)  
 XX — Packing 8034451 (10)  
 YY — Packing 8034450 (6)  
 ZZ — Gasket (4)  
 AB — Reducer AN893-12C (8)

Figure 50. Hydraulic test stand — accessory parts — legend.



**Figure 50. Hydraulic test stand – accessory parts.**



*Figure 51. Launcher hydraulic power package tester.*

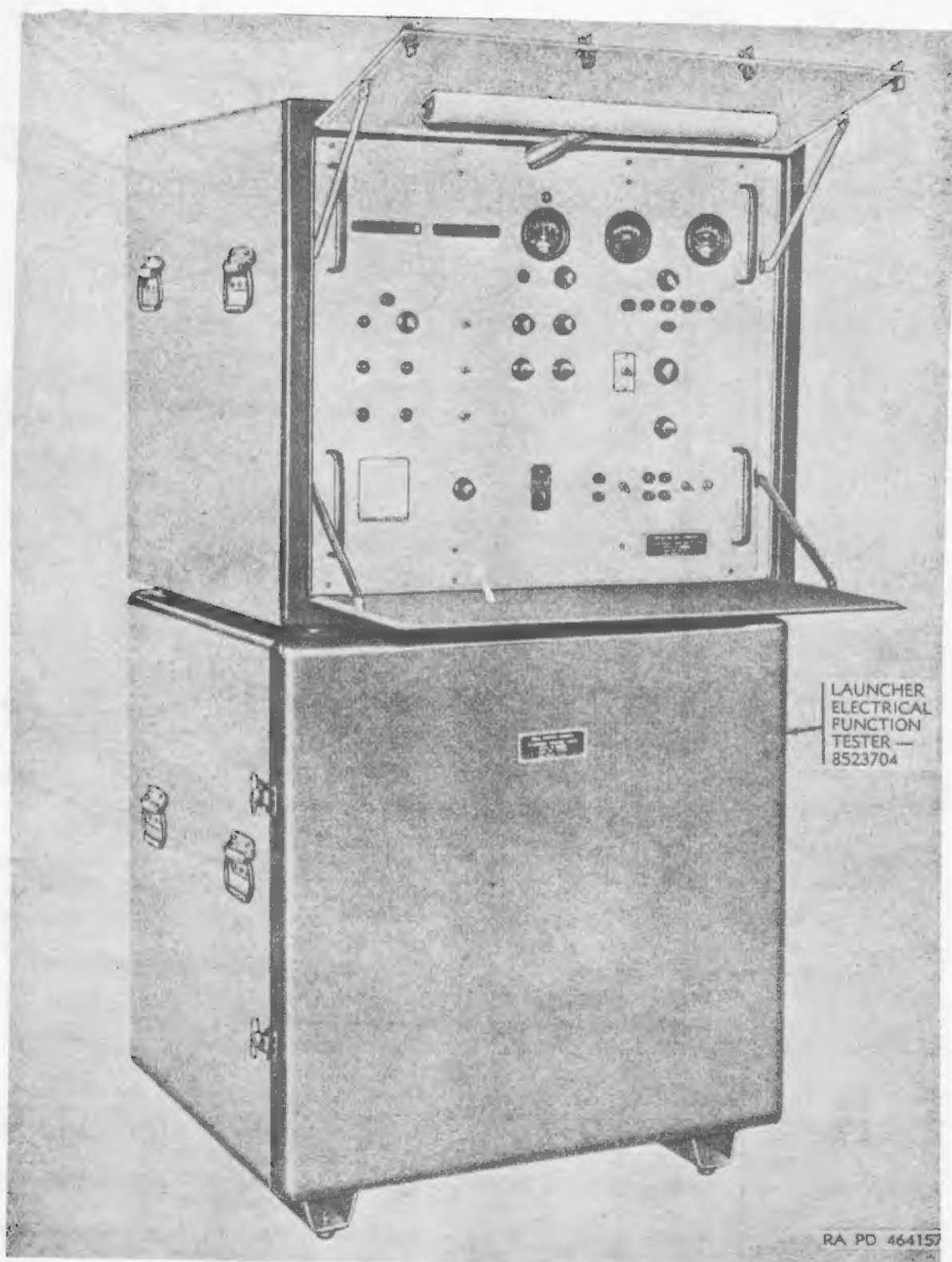


Figure 52. Launcher electrical function tester.

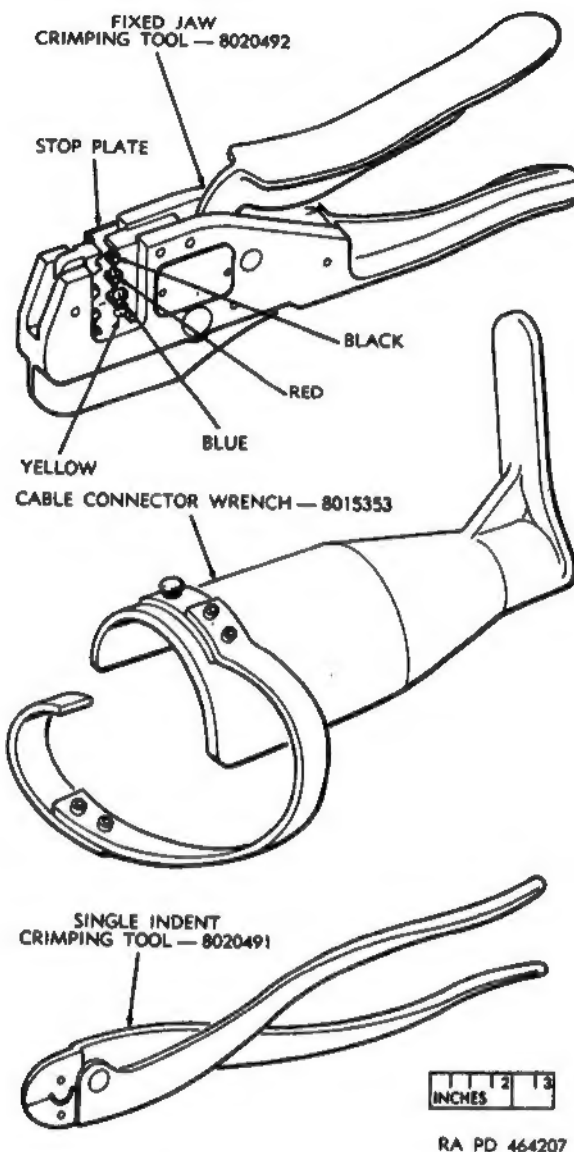
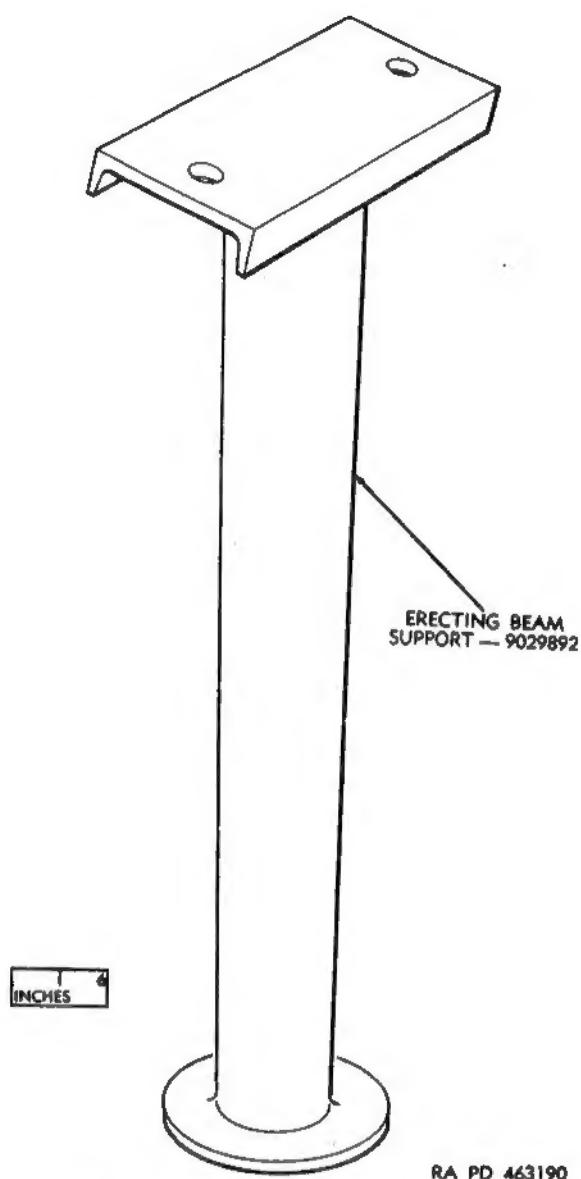


Figure 53. Erecting beam support.

Figure 54. Electrical system special tools.

Table IV. Special Tools and Equipment — Continued

Item	Identifying No.	References			Use
		Fig.	Par.	TM	
Protective cap ----	8022089	55	80 ---	None ----	Used on 3/8-inch diameter tube assemblies.
Protective cap ----	8022694	55	80 ---	None ----	Used on 1/2-inch diameter tube assemblies.
Protective cap ----	8022090	55	80 ---	None ----	Used on 3/4-inch diameter tube assemblies.
Protective cap ----	8022091	55	80 ---	None ----	Used on 1-inch diameter tube assemblies.

Table IV. Special Tools and Equipment—Continued

Item	Identifying no.	References			Use
		Fig.	Par.	TM	
Protective plug .....	8161819	55	80.....	None .....	Used on ¼-inch diameter tube assemblies.
Protective plug .....	8161820	55	80.....	None .....	Used on ¾-inch diameter tube assemblies.
Protective plug .....	8161821	55	80.....	None .....	Used on ½-inch diameter tube assemblies.
Protective plug .....	8161822	55	80.....	None .....	Used on ¾-inch diameter tube assemblies.
Protective plug .....	8161823	55	80.....	None .....	Used on 1-inch diameter tube assemblies.
Shim .....	9978587	55.1	212c(20)	None .....	Used on hydraulic jack to space locking bar and adapter correctly when attaching bolt and setscrew.
Spanner wrench .....	9978588	55.1	212b(12) 212c(13)	None .....	Used to install thread protector on jack ram.
Thread protector ....	9978589	55.1	212b(12) 212c(16)	None .....	Used to install jack ram on hydraulic jack.
Preformed packing inserter .....	9978590	55.1	None .....	None .....	Used to install preformed packing on hydraulic jack control valve slide.
Jack ram inserter....	9978591	55.1	212b(12) 212c(9)	None .....	Used to install jack ram on hydraulic jack.
Jack ram inserter....	9978592	55.1	211b(9) 211c(8)	None .....	Used to install piston on hydraulic jack.
Preformed packing inserter .....	9978593	55.1	None .....	None .....	Used to install preformed packing on hydraulic jack pump stem.

### 31. Parts

Maintenance parts are listed in Department of the Army technical manuals (TM's) 9-1440-250-15P/1/1 and 9-1440-250-15P/6/1 which are the authority for requisitioning replacements. Parts not listed in these supply manuals, but required for DS and GS maintenance operations, may be requisitioned and will be supplied, if available, when the need is substantiated. Requisitions for these parts will contain a complete justification of requirements.

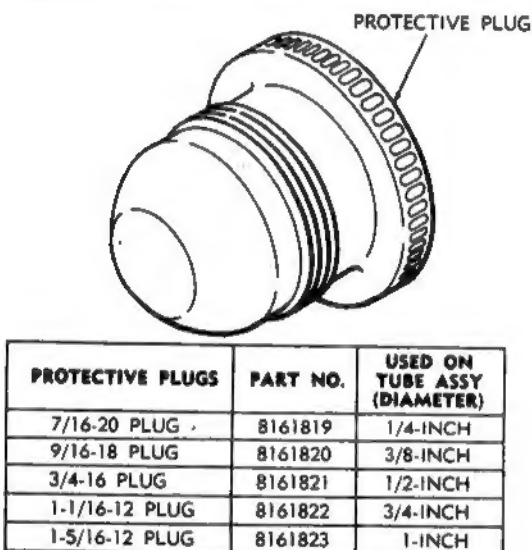
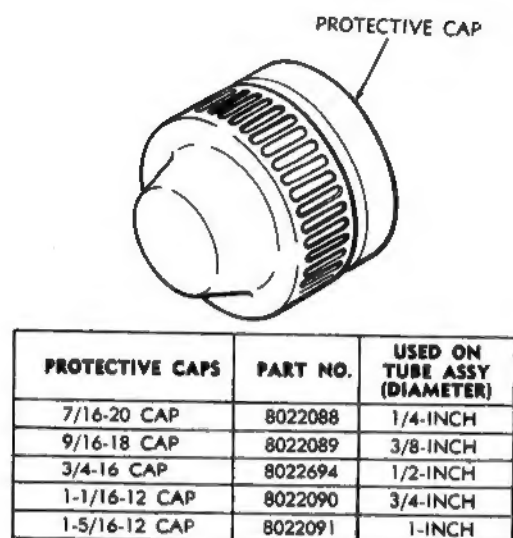
### 32. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this mate-

riel are listed in Department of the Army supply catalogs (SC's) 4935-95-CL-A31, SC 4935-95-CL-A32, SC 4935-95-CL-A33 and 4935-95-CL-A42 and are authorized for issue by Tables of Allowances and Tables of Organization and Equipment.

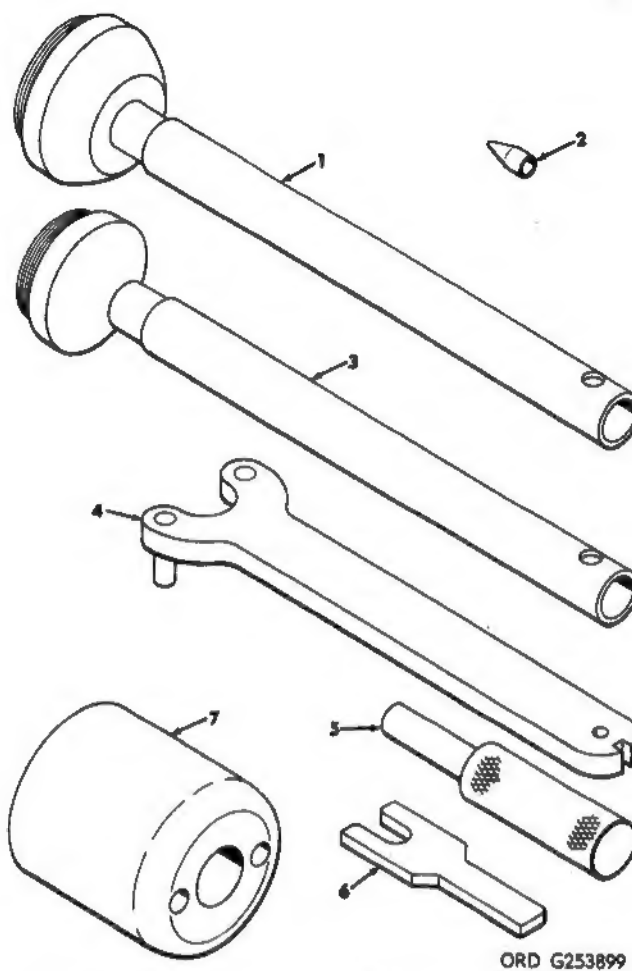
### 33. Special Tools and Equipment

The special tools and equipment described in table IV are listed in Department of the Army SC 4935-92-CL-011. This tabulation contains only those special tools and equipment necessary to perform the operations described in this manual. It is included for information only, and is not to be used as a basis for requisitions.



RA PD 464208

Figure 55. Protective caps and plugs.



- 1-Jack ram inserter 9978592  
 2-Preformed packing inserter 9978593  
 3-Jack ram inserter 9978591  
 4-Spanner wrench 9978588  
 5-Preformed packing inserter 9978590  
 6-Shim 9978587  
 7-Thread protector 9978589

Figure 55.1. Hydraulic jack repair tools.

Table IV.1. Fabricated Tools

Item	Use
Cylinder assembly holding fixture	Used for holding the erecting beam power cylinder assembly or the equilibrator cylinder assembly during disassembly and assembly operations.
Stud puller	Used with a hydraulic jack or other implementation for removing the trunnion pins installed in the launcher strut assemblies.
Pilot shaft	Used during installation of the UP-lock cylinder on the launcher.

### 33.1. Fabricated Tools

a. *General.* Instructions for the fabrication of tools having specific application to launcher materiel are contained in this paragraph. These tools are listed and described in table IV.1. The materials for fabricating these tools are listed in tables IV.2 and IV.3 and may be requisitioned through normal supply channels or procured locally.

**b. Fabrication and Assembly of the Cylinder Assembly Holding Fixture.**

- (1) Fabricate the parts shown in figure 55.2 and refer to table IV.2 for material requirements.

*Note.* The numbers listed in the Detail column of table IV.2 refer to the key numbers shown in figures 55.2 and 55.3.

- (2) Assemble the holding fixture as shown in figure 55.3.

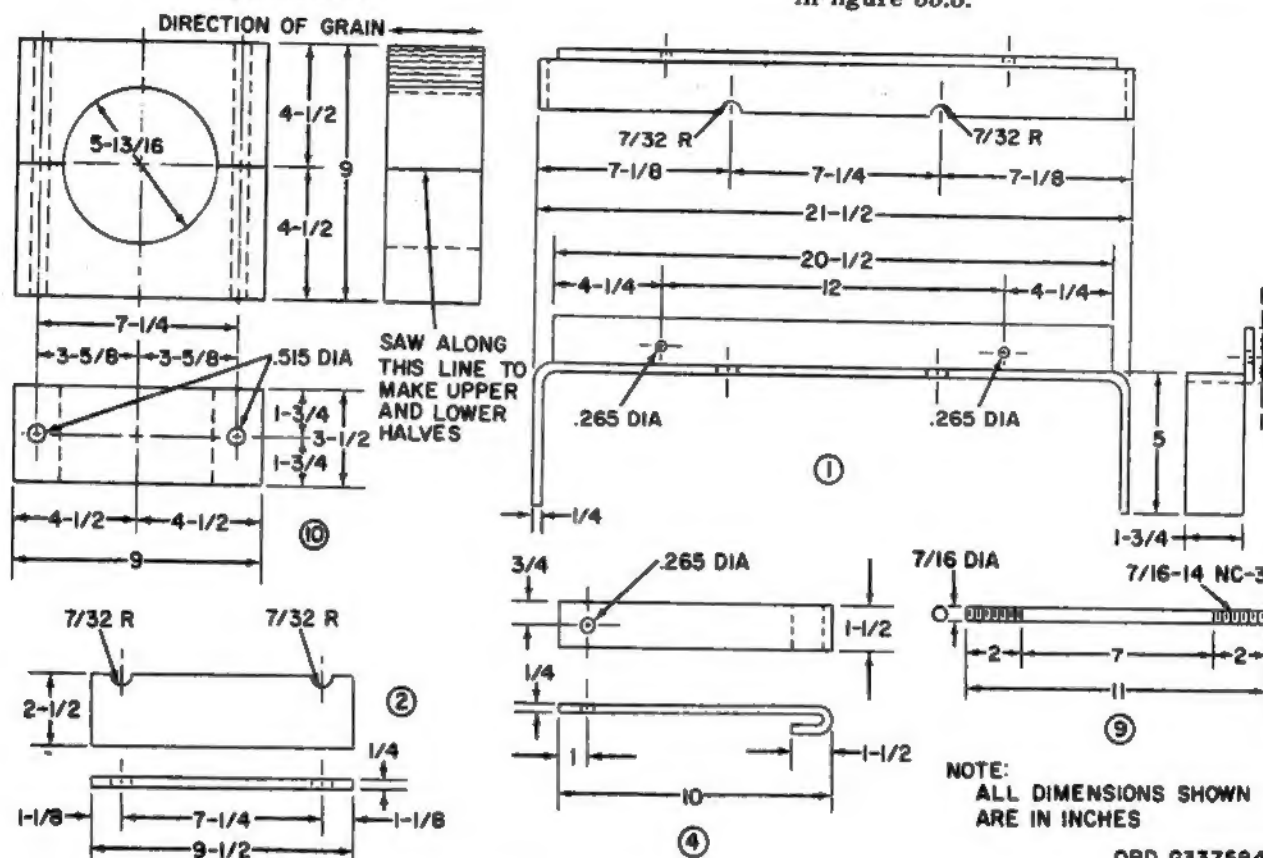
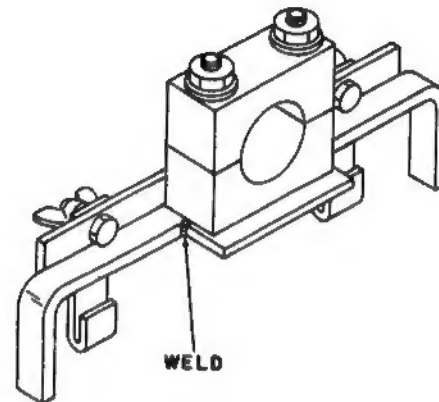
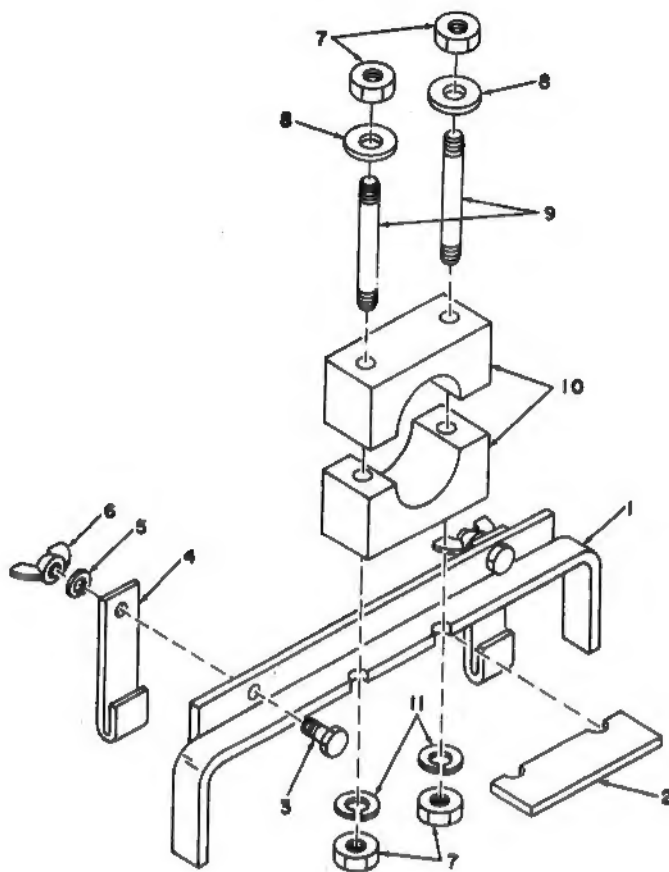


Figure 55.2. Cylinder assembly holding fixture—fabrication.

Table IV.2. Cylinder Assembly Holding Fixture—Materials List

Detail	Quantity	Description	Stock size (in.)	Federal spec <sup>1</sup>
1	1	Structural angle stl	2 x 2 x 1/4 x 31	QQ-S-741
2	1	Flat stl bar, type CD1020	2 1/2 x 1/4 x 9 1/2	QQ-S-633a
3	2	1/4-20 x 1 1/2 hex-hd mach bolt	.....	H101
4	2	Flat stl bar, type CD1020	1 1/2 x 1/4 x 12	QQ-S-633a
5	2	1/4-in-id split lk washer	.....	H001
6	2	1/4-20 std wing nut	.....	H101
7	4	7/16-14 std hex. nut	.....	H101
8	2	7/16-in-id std flat washer	.....	H101
9	2	Stl rod, type CD1020	7/16 x 11	QQ-S-633a
10	2	Wood (oak or equiv)	3 1/2 x 9 x 9	.....
11	2	7/16-in-id split lk washer	.....	H001

<sup>1</sup> Or equivalent.



ORD 6337565

- 1-Mount
- 2-Plate
- 3- $\frac{1}{4}$ -20 x  $1\frac{1}{2}$  hex-hd mach bolt (2)
- 4-Clamp (2)
- 5- $\frac{1}{4}$ -in-id lk washer (2)
- 6- $\frac{1}{4}$ -20 wing nut (2)

- 7- $\frac{7}{16}$ -14 hex. nut
- 8- $\frac{7}{16}$ -in-id fl washer
- 9-Tie rod
- 10-Split block
- 11- $\frac{7}{16}$ -in-id lk washer

Figure 55.3. Cylinder assembly holding fixture—assembly.

c. *Fabrication and Assembly of the Stud Puller.* Fabricate the parts and assemble the stud puller as shown in figure 55.4. Refer to

table IV.3 for material requirements.

Note. The numbers listed in the *Detail* column of table IV.3 refer to the key numbers shown in figure 55.4.

Table IV.3. Stud Puller—Materials List

Detail	Quantity	Description	Stock size (in.)	Federal spec <sup>1</sup>
1, 2	1	Flat stl plate, type CD1020	11 x $\frac{1}{2}$ x 11	QQ-S-633a
3	4	Stl rod, type CD1018	1 $\frac{1}{4}$ x 33	QQ-S-633a
4	4	Stl rod, type CD1018	1 $\frac{1}{4}$ x 68	QQ-S-633a
5	8	1 $\frac{1}{4}$ -12 heavy hex. nut	.....	H101

<sup>1</sup> Or equivalent.

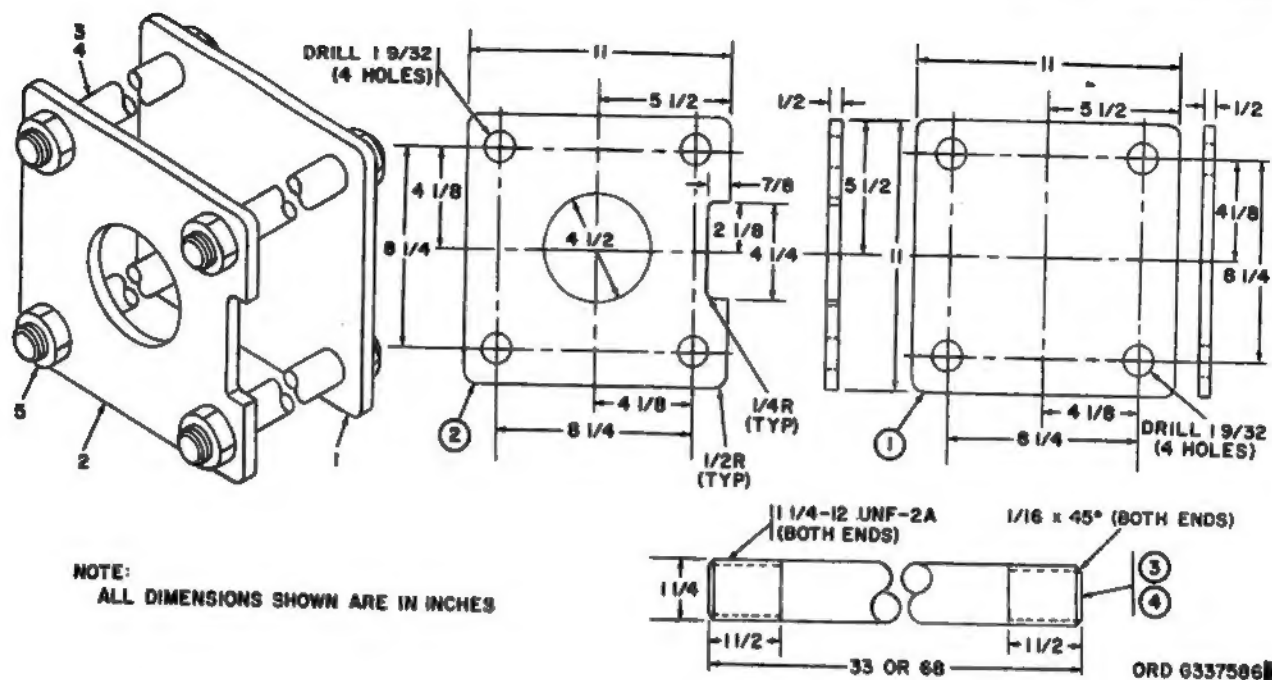
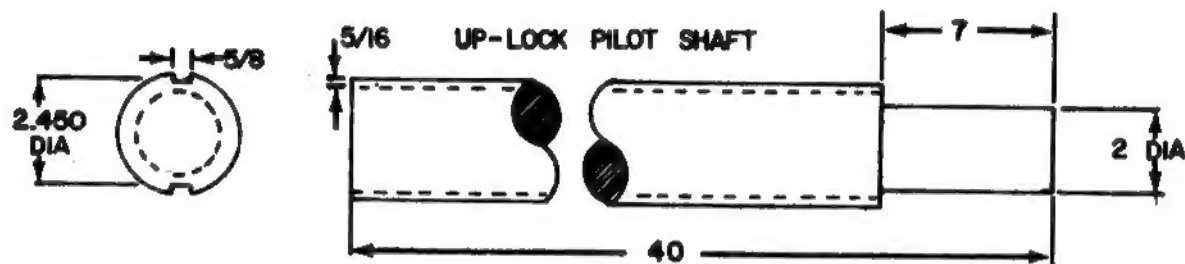


Figure 55.4. Stud puller—fabrication and assembly

d. Fabrication of Pilot Shaft for Installing Launcher Up-Lock Cylinder.

- (1) *General.* Instructions for the fabrication of pilot shaft are contained in steps (1) through (3). DS, GS, and Depot Maintenance personnel are authorized to fabricate this tool.
- (2) *Materials.* The material requirements consist of a low-carbon steel rod, 41 inches long.

- (3) *Procedure.* Fabricate the pilot shaft as shown in figure 55.5. When installing an up-lock cylinder on the launcher, position the up-lock cylinder and insert the pilot shaft through the up-lock cylinder and launcher strut arms. The pilot shaft will maintain alignment and hold four keys 8167846, in place while the shaft 8167817, is being driven through the strut arms and up-lock cylinder.



TWO 5/8 KEYWAYS, LENGTH OF SHAFT  
NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES.

MI 205

Figure 55-5. Pilot shaft-fabrication